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MATERIAL FOR A MONOGRAPH OF THE SPHENISCIDÆ.

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This paper is based chiefly upon the specimens contained in the Philadelphia Academy and Smithsonian Institution, one portion of it representing a descriptive catalogue thereof. The Academy's collection is the largest and most nearly perfect in this country, and has not heretofore been worked up; while that of the Smithsonian is particularly valuable because it contains the types of all the species described as new by Mr. T. R. Peale, in 1848. With this material is collated that in the Museum of the Boston Society, as recently elaborated by the custodian, Prof. Hyatt. Extensive lists of synonyms have been prepared, representing, it is believed, every name, generic or specific, that has been proposed for these birds, with numerous additional references. Some anatomical investigations have been made in an attempt to determine the genera. An annotated list, in chronological order, of the principal authorities upon the subject, from the Linnæan starting-point to the present day, is likewise given.

I. ON THE LITERATURE OF THE SUBJECT.

1766. LINNÆUS, *Syst. Nat.* i. pp. 214, 219. Gives two species, under different genera. One, *Diomedea demersa*, based on Willoughby, 242, Edwards, 94 (black-footed penguin), Clusius, 101 (*Anser magellanicus*), and Brisson, vi. pp. 97, 99, pl. 9 (*Spheniscus*[1] *nœvius*) is now the SPHENICUS DEMERSUS auct. It is quoted from the Cape of Good Hope. The other, *Phaeton demersus*, is based upon Edwards, 49 (red-footed penguin), and the *Catarractes*[1] of Brisson, vi. 102; it is the *Eudyptes catarractes* of this paper. In strict interpretation, the species should be called

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[1] These names, *Spheniscus* and *Catarractes*, conflict with no Linnæan genera, and so far are tenable. *Spheniscus* holds; but the other is antedated by *Catarractes* of Möhring, and therefore falls, since Möhring's name does not conflict with a Linnæan one. If the very strict rules that some contend for should go in force among the penguins, I hardly know what would become of our nomenclature of the group. The *bouleversement* of the familiar names would certainly be complete.

Eudyptes demersa; but the liability to confusion renders this inexpedient.

1768. PENNANT, *Phil. Trans.* lviii. p. 91, pl. 5. Gives an "Account of the different species of the Birds called Penguins," and among other things characterizes the smaller of the two species of *Aptenodytes*, subsequently called *longirostris* by Scopoli, and later named *pennantii* by Gray.

1777. SCOPOLI. I have not the work at hand, but, as well as I can gather from other sources, Sonnerat's penguins are named as follows: Manchot de la Nouvelle Guinée, *Sonn.* Voy. 180, pl. 113 = *Aptenodytes longirostris*, SCOP. (a name that appears to hold good, antedating *pennantii* of Gray). Manchot papou, *Sonn.* 181, pl. 115 = *Aptenodytes papua*, SCOP. Manchot à collier de la Nouvelle Guinée, *Sonn.* 181, pl. 114 = *Aptenodytes platyrhyncha*, SCOP. The last is *Spheniscus demersus*, var. *magellanicus;* the others are valid new species.

1781. FORSTER, *Comm. Soc. Reg. Sc. Gotting.* iii. 121. "Historia Aptenodytæ generis avium orbi australi proprii." This article stands *facile princeps* among the writings upon this subject of the last century. It not only marks a great advance upon previous knowledge of the family, but is more satisfactory in every respect than anything that followed for a long period; in fact, it is the real beginning of the exact literature. Placing all the species in the genus *Aptenodytes*, the author divides them into the *Cristatæ*, containing one species, and the *Alophæ*, with eight species. His crested species is *chrysocome*, n. s.; and I agree with Dr. Schlegel that this is not the same bird as Forster's *catarractes*. However his figure may strike us, and however we may interpret his language, Forster certainly meant to indicate two different species; and accordingly we cannot relegate *chrysocome* to *catarractes*, as Gray has done. Forster's crestless species are: *A. patachonica*, n. s., the first recognizable description of the species Gray subsequently called *forsteri; A. papua*, SCOP.; *A. antarctica*, n. s.; *A. magellanicus*, n. s., but the collared variety of *demersus*, and the same as the Manchot du Cap de Bonne Espérance, Buff., Pl. Enlum. 382; *A. demersus* (= *Diomedea demersa*, L.); *A. catarractes* (= *Phaëton demersus*, L.); *A. torquata*, n. s., but a variety of *demersus*, the same as *A. platyrhyncha*, SCOP.; and *A. minor*, n. s. Thus, of Forster's nine species, six are here named for the first time; seven are valid; and four are valid new species. Most of the species are also figured. Forster does not give *longirostris*, SCOP.; this, added to his seven good species, gives us the following list of eight valid and well-determined species, up to date.

1. DIOMEDEA DEMERSA, Linn. 1766.
2. PHAETON DEMERSUS, Linn. 1766. [=CATARRACTES, Auct.]
3. APTENODYTES LONGIROSTRIS, Scop. 1777. [=PENNANTII, Gray.]
4. APTENOTYDES PAPUA, Scop. 1777. [nomen ineptum.]
5. APTENODYTES CHRYSOCOME, Forst. 1781.
6. APTENODYTES PATACHONICA, Forst. 1781.
7. APTENODYTES ANTARCTICA, Forst. 1781.
8. APTENODYTES MINOR, Forst. 1781.

1782. BONNATERRE, *Ency. Method.* i. p. 67, 68. Figures *Apt. papua* (pl. 17). Names *Apt. gorfua;* it is the same as *Phaëton demersus*, L.

1788. GMELIN, *Syst. Nat.* i. pp. 555–9. This author gathers eleven species, as follows. None of those given additional to Forster's are valid:—

1. A. CHRYSOCOME, p. 555. This is based primarily upon Forster, 133, pl. 1, although the author also quotes the Manchot sauteur, Buff. ix., 409, and Manchot huppé de Siberie, P. E. 984, which is *catarractes.* But as the description is applicable to either species, and the prior reference is to Forster, I do not see why Gmelin's bird should not be considered the same as Forster's.

2. A. PATACHONICA, p. 556. This is compounded of equal parts of the two species of *Aptenodytes;* for neither Gmelin nor any of the earlier authors seem to have made the discrimination, although we can, in certain cases, as those of Scopoli and Forster, determine which species they had in view. Thus, Gmelin quotes Forster, 137, pl. 2, and Mill. Ill. pl. 20, both of which are true *patachonica*, Forst. (*forsteri*, Gray); and also quotes Buff., ix. 399; P. E. 975; Sonnerat, Voy. 179, pl. 113; Pennant, Phil. Trans. lviii. p. 91; Pennant. G. of B. 66, pl. 14; and Latham, Syn. vi. 563, No. 2; most of which, when not including both species, are unmistakably the smaller species (*pennantii*, Gray).

3. A. PAPUA, p. 556. Based on Sonnerat and Forster.

4. A. ANTARCTICA, p. 557. Forster's species.

5. A. MAGELLANICUS, p. 557. Forster's species. Mill., pl. 34, Lath., Syn. vi. 569, are also quoted. It is a variety of *demersus.*

6. A. DEMERSUS, p. 557, is the Linnæan bird. Gmelin makes a variety, β, on Brisson's *nævius* coupled with the *Manchot à bec tronqué* of Buffon, ix. 411; P. E. 1005.

7. A. CATARRACTES, p. 558, stands on the same footing as the Linnæan *Phaëton demersus.*

8. A. TORQUATUS, p. 558, is the same as Forster's bird; the collared variety of *demersus.* Sonnerat, pl. 114, etc.

9. A. MINOR, p. 558 = *A. minor*, Forst.

10. A. CHILENSIS and 11, A. CHILOENSIS, p. 559, are based on Molina's descriptions of a young *S. demersus* in downy plumage, and one of the same species in imperfect feathering.

1790. LATHAM, *Index Ornithologicus*, ii. 878 *et seq.* In this work binomial names are given to the species described under English names in the *General Synopsis*, vol. vi. of the same author. We may also conveniently consider, in this connection, Latham's *General History*, vol. x. p. 381 *et seq.*, which brings the subject, so far as this author is concerned, down to 1824. As expressing the author's mature views, we take up the species as given in the latter work, referring also to the earlier ones. There are fifteen of them, as follows:—

1. CAPE PINGUIN, p. 381; Gen. Syn. vi. 566; *Apt. demersus*, Ind. Orn. ii. 879. This is the original Linnæan *Diomedea demersa.* Latham makes a var. A. out of Brisson's *S. nævius*, and a var. B. of the *Pinguin à lunettes* of Pernet, Voy. ii. 17, pl. 7, f. 3. Neither variety stands good.

2. MAGELLANIC PINGUIN, p. 383; Syn. 569; *Apt. magellanicus*, Ind. 880. This is the collared variety of *demersus.*

3. CRESTED PINGUIN, p. 385; Syn. 561; *A. chrysocome*, Ind. 878. This is essentially the same as Forster's and Gmelin's *chrysocome*, but Latham also makes some other quotations (as *Pinguinaria cristata*, Shaw, Nat. Misc. pl. 437, and Planch. Enl. 984), which are probably *catarractes.*

4. RED-FOOTED PINGUIN, p. 386; Syn. 572; *Apt. catarractes*, Ind. 881. The original *Phaeton demersus* of Linnæus.

5. LITTLE PINGUIN, p. 387, pl. clxxx = *A. minor*, Forst.

6. NEW HOLLAND PINGUIN, p. 388. Indeterminable with certainty; no references are given, but the description points to a young *S. demersus.* ("Bill black, upper mandible hooked near the tip, under truncated, legs flesh-colored brown, webs black.")

7. CHILOE PINGUIN, p. 388; Syn., Suppl. ii. 361; *A. chiloensis*, Ind. 881. Same basis as Gmelin's *chiloensis*.

8. PAPUAN PINGUIN, p. 388; Syn. 565; *A. papua*, Ind. 879 = *A. papua*, Scop.

9. ANTARCTIC PINGUIN, p. 389; Syn. 565; *A. antarctica*, Ind. 879 = *A. antarctica*, Forst.

10. PATAGONIAN PINGUIN, p. 390; Syn. 563; *A. patagonica*, Ind. 878. Here, as in Gmelin's case, the quotations of both the species of *Aptenodytes* are brought together, Buffon, Sonnerat, Forster, Miller, Shaw, Pennant, and others being indiscriminately cited.

11. COLLARED PINGUIN, p. 391; Syn. 571; *A. torquata*, Ind. 880. Same as Forster's bird of that name; the collared variety of *S. demersus*.

12. HAIRY PINGUIN, p. 392. No citations. Indeterminable. The bird is unquestionably the young of one of the well-known species, probably *Aptenodytes longirostris*, to judge from the dimensions assigned.

13. WOOLLY PINGUIN, p. 392, pl. clxxxi. No citations. Apparently a "new species," like the hairy penguin, and evidently the young of *Aptenodytes longirostris*.

14. THREE-TOED PINGUIN, p. 393; Syn. Suppl. ii. 361; *Aptenodytes molinæ*, Ind. 881. This is the same as Gmelin's bird, both being based on *Diomedea chilensis* of Molina. It is *Spheniscus demersus*.

Latham's fifteenth species, the "Apterous Pinguin," is the *Apteryx australis*.

1797. GEOFF. ST. HILIARE. *Mill. Mag. Ency.* iii. vi. p. 11. "Sur les Manchots."

1789–1813. SHAW, *Naturalist's Miscell.* A genus *Pinguinaria* is proposed; it is a synonym of *Aptenodytes*. A species *cristata* is described and figured (pl. 437); it is *Phaëton demersus*, Linn. The smaller of the two species of *Aptenodytes* is indicated under the name of *patachonica*, and figured (pl. 409).

? 1811. ILLIGER. Both Gray and Schlegel quote a certain *Aptenodytes fuscirostris*, Ill. among the synonyms of *Spheniscus demersus*. I have not been able to verify the reference, and do not know whether or not it is in the Prodromus, 1811.

1816. VIEILLOT, *Analyse*, etc. A genus, *Eudyptes*, is instituted; the name holds for the crested group, if these are considered worthy of generic rank.

1820–26. VIEILLOT, *Galerie*, etc. *Aptenodytes papua*, Scop. is figured (pl. 299).

1825. STEPHENS, *Cont. of Shaw's Gen. Zool.* Genus *Chrysocoma*, a synonym of *Eudyptes*, V., 1816, is instituted.

1825. WEDDELL, *Froriep's Notizen*, xii. 198. On species of *Aptenodytes*, etc., from the South Georgians.

1832. WAGLER, *Isis.* A genus, *Pygoscelis*, is based upon *Aptenodytes papua*, Scop.

1833. YARRELL, *P. Z. S.* i. 33, 65. On the hairy and woolly penguins of Latham.

1834. BENNETT, *P. Z. S.* ii. 34. Habits of *Aptenodytes.*

1834. MEYEN, *Nova Acta Acad. Cæs. Leop.-Carol.* xvi. supp. i. 110, pl. 21. A species is named *Spheniscus humboldtii*, from Peru; it is a synonym of *S. demersus.* The author, indeed, remarks upon the likelihood of its being the same as P. E. 382. I have seen specimens precisely like the plate here given.

1835. REID, *P. Z. S.* iii. 132. Anatomy of *Apt. patagonica.*

1837. BRANDT, *Bull. Acad. Sc. St. Petersb.* ii. 305. A very important and valuable contribution, like the rest of this eminent naturalist's publications. A new species, *Catarractes chrysolophus* (the first valid new one for half a century!) is described.

1841. HOMBRON and JACQUINOT, *Ann. Sc. Nat.* xii. p. 320. A notable article. Two valid new species are described, viz., *Catarractes adeliæ* and *C. antipodes*, raising the number of known species to *eleven.* A few years subsequently (1846), these species are figured by the same authors (Voy. Pôle Sud, pl. 33), and one of them (*adeliæ*) is made the type of a new genus, *Dasyrhamphus.* (See also *Comptes Rendus*, 1841, xiii. 360, on the same species.)

1842. GLOGER, ——. Institutes the genus *Dypsicles*; type *demersus.* (According to Gray; I have no means of verifying the citation.)

184–. GRAY, *Voyage of the Erebus and Terror*, *Birds.* In this very acceptable contribution, Mr. Gray figures three of the previously known species, viz., *papua*, *antarctica*, and *antipodes*, in pls. 25, 26, 27 respectively, and describes and figures a new species, *Pygoscelis brevirostris*, pl. 28; this last, however, is identical with *adeliæ*, as the author soon discovered. He also describes another new species, *Eudyptes pachyrhyncha*, p. 17; and the name will stand, if, as Mr. Gray holds, *chrysocome* and *catarractes* Forst., Gm. and Lath., are the same bird; but I cannot agree with him here. I think that these older authors had two species in view, and that their *chrysocome* is what Gray here names *pachyrhyncha.*

1844. LICHTENSTEIN, *Edit. Forster's Descr. Anim.* In this representation of Forster's labors, among other things, two new names are proposed, but neither of them stands. *Aptenodytes palpebrata*, from the Cape of Good Hope, is the original Linnæan *Diomedea demersa*, whilst *A. brasiliensis* is a variety of the same species, equivalent to the old *torquata* or *magellanicus* of Forster.

1844. GRAY, *Am. Mag. Nat. Hist.* xiii. 315. The author carefully distinguishes the two species of *Aptenodytes*, calling one of them *forsteri*, a name anticipated by *patachonica*, Forst.; and the other *pennantii*, which is antedated by *longirostris* of Scopoli.

1844. GOULD, *P. Z. S.* xii. 87. Description of a new species, *Apt. undina;* it is the same as *Apt. minor*, Forst.

1848. PEALE, *Ornith. of the U. S. Expl. Exped.* As ornithologists are aware, the Ornithology of the Wilkes's Expedition was "officially" cancelled by the United States Government, and the edition was recalled as far as possible, on account of the unsatisfactory manner in which the author of the work was considered to have performed his task. But the attempted suppression proved impossible; the work is extant, and must be recognized. In his treatment of the penguins, Mr. Peale shows his familiarity with the birds themselves, but unfortunately some ignorance of ornithological literature. With a copy of his work before us, and all his original specimens, now in the Smithsonian, we find that he has discriminated the species with perfect accuracy; and he gives many new and interesting biographical data. His shortcomings are solely in the matter of nomenclature. We are enabled to make the following determinations:—

A. MAGNIROSTRIS, Peale,= *Sph. demersus*, var. *magellanicus.*

"A. CHRYSOCOME, GM.?" Peale,= *Eudyptes catarractes.*

A. FLAVILARVATA, Peale,= *Pygoscelis antipodes* (H. and J.)

A. LONGICAUDATA, Peale,= *Pygoscelis adeliæ* (H. and J.)

A. TÆNIATA, Peale,= *Aptenodytes papua* of Scopoli, but the name must stand, since Scopoli's is geographically inapplicable. Peale's other names are correct; his *patagonica* is Forster's bird, the true "emperor penguin."

1849. Gray, *Genera of Birds*, iii. Since the *Spheniscidæ*, like the *Psittacidæ*, the *Picidæ* and some others, form a remarkably definite and somewhat isolated group of birds, it is particularly surprising that such an accomplished ornithologist as Mr. Gray should here and elsewhere dismember the *Alcidæ* for the purpose of wedging the penguins bodily in between different genera of auks. We have already had occasion to speak of this as "a great blemish" upon Mr. Gray's treatment of these two families, and our former opinion is strengthened with the increase of our knowledge upon the subject. In the "Genera," Mr. Gray adopts three genera for the *Spheniscidæ*, giving good characters and faithful illustrations. We believe the division to be a very close approximation to the natural order—in fact, we are not sure that these three genera are not a more truthful expression of fact than the four we are led to adopt in the present paper. Mr. Gray catalogues the species known at that date, but we do not think he is in this matter nearly so successful as in his generic divisions. (See 1871, Gray, below.) A beautiful colored plate (pl. 176) illustrates *Eudyptes pachyrhyncha*, Gray. The article is one of the few that the student can confidently consult to gain a clear general idea of the subject.

1850–56. Bonaparte, ——? I do not know where this author has treated of the penguins, and none of the authorities consulted give any reference. According to quotations, he has instituted a genus *Eudyptila* upon *Aptenodytes minor*, Forst., and has renamed the two species of *Aptenodytes* that Gray named *forsteri* and *pennantii*, calling them *imperator* and *rex* respectively. There is no excuse whatever for this.

1858. Cassin, *U. S. Exploring Expedition*, *Birds*. Uniting Peale's field studies with an accurate determination of the species, Mr. Cassin's article on the penguins is one of special importance. After examination of the original specimens themselves, we find Mr. Cassin's identifications correct throughout; but, for some reason, *Eudyptes catarractes* does not appear, although several specimens were brought home by the Expedition, as shown in the body of this paper.

1859. Gould, *P. Z. S.* 98. Mentions several penguins in a list of birds from the Falkland Islands.

1860. Abbott, *Ibis*. 336. The *demersa* of this author, according to Gray and Sclater, is of the variety *magellanicus*. Gray puts Abbot's *chrysocome* as a synonym of *nigrivestis*, Gould; but as this last is a synonym of *chrysocome*, Forst., the affair seems to odd itself even.

1860. SCLATER, *P. Z. S.* 382. In a catalogue of the Falkland Islands' *Avifauna*, the author gives (p. 392) five species of penguins (*pennantii*, *magellanicus*, *chrysolopha*, *chrysocome*, Forst. and *wagleri*, Scl.). He is, we think, perfectly justified in cancelling Scopoli's name "*papua*" on the score of geographical inapplicability, but in proposing to call the species after Wagler, has he not overlooked Peale's prior designation? (For additions and corrections, *cf.* ID. *ibid.*, 1861, 45.)

1860. GOULD, *P. Z.* p. 418. Two new species of *Eudyptes* are described. One of them, *E. nigrivestis*, is a synonym of *chrysocome*, Forst. The other, *E. diademata*, is a valid species. Both are from the Falklands.

1861. GOULD, *Ann. Mag. N. H.* 218. Notices of his crested species.

1865. OWEN, *P. Z. S.* xxxiii. 438. Results of a post-mortem examination of *Aptenodytes* "*patachonica*."

1865. PELZELN, *Reise Novara*, pl. 5. *Eudyptes* "*chrysocome*" with young, figured.

1867 (originally 1840). NITZSCH, *Pterylography* (*Ray Soc.*, *ed. Sclater*). An important contribution of original and new matter on the pterylosis of the family.

1867. SCHLEGEL, *Mus. Pays-Bas*, *Urinatores*. All the known species of the family being represented in the Leyden Museum, this article is, in effect, a monograph of the *Spheniscidæ;* and it is, in every respect, the most satisfactory treatise upon the subject that has appeared, being as much superior to the contemporaneous literature as Forster's was in its day and generation. As far as the determination of the species is concerned, our own studies bear out Dr. Schlegel's in every single instance; indeed, it seems to us impossible to reach any other conclusion, when any considerable and sufficient amount of material is examined. The present article of ours is so completely an indorsement of Dr. Schlegel's, that the only points of difference are one or two unimportant synonymical determinations among the crested species, which, after all, will probably remain matters of opinion. Dr. Schlegel's analysis of the species is an excellent clue to their determination. He presents five primary sections, the first representing *Aptenodytes*, the fourth and fifth containing, respectively, *S. minor*, and *S. demersus* with its variety *magellanicus*. The third contains the four crested species (divided into that one with the short tail, *catarractes*, and the three with longer tail, *chrysocome*, *chrysolopha*, and *diademata*) in one sub-group, to which *antipodes* is added as a second sub-group. The second includes the three longest-tailed species, *adeliæ*, *papua*, and *antarctica*. The article is open to criticism on the score of the generic determination, we think, for we show, in another place, that there certainly are several well-marked modifications of cranial structure, warranting, if not enforcing, as many generic divisions. But even here the difference between Dr. Schlegel's results and our own is rather apparent than real, for the divisions he makes seem to correspond, in the main, with the genera we find it necessary to adopt. (*Cf. Newton*, *Zool. Rec.* 1867, 124. *Ibis*, 1868, 110.)

1867. HUXLEY, *P. Z. S.*, 458. The penguins form the fourth of the several third-rate groups into which the author proposes to divide birds, in his celebrated "Classification," and are called "*Spheniscomorphæ*"—a name anticipated by *Squamipennes*, *Nullipennes*, *Impennes*, *Ptilopteri*, and some other designations. Of the nine sets of characters assigned, the fifth, sixth, seventh, and eighth are more or less perfectly diagnostic; the ninth is shared by nearly all swimming and some wading birds; the fourth and first are no more applicable to penguins than to a great many other birds; the third is not likewise particularly pertinent, and the second is untrue, so far as relates to the basipterygoid processes—these being present in some species of the family. The group, it is said, "contains" the single family *Apterodytidæ*, and comprises three genera, *Eudyptes*, *Spheniscus*, and *Apterodytes* [lege Aptenodytes]. It is probable that final determinations will show that Prof. Huxley's views are perfectly sound in this last particular. (V. cranial characters, *infrà*.)

1868. LECOMTE, *P. Z. S.* 527. Biographical.

1869. LAYARD, *Ibis*, 378. On destruction of *E. chrysocome* in the Crozette Islands.

1869. BULLER, *Trans. N. Zealand Inst.*, 112. Occurrence of *S. undinas* (sc. *minor*) in New Zealand.

1870. FINSCH, *P. Z. S.* p. 332, pl. 25. A new species, *Dasyrhamphus herculis*, is described and figured; it is the young of *adeliæ*, with the throat white, as indeed Mr. Gray had already determined in the case of the British Museum specimen. A specimen in the Philadelphia Academy represents the same thing.

1871. Gray, *Hand-list*, iii. pp. 98, 99. Mr. Gray retains the *Spheniscidæ* in the unnatural association with the *Alcidæ* that we have already been forced to criticize adversely. The three genera he adopts appear to be well founded, the author here showing the same admirable conservatism that guides his recognition of full genera throughout the work; but we think that some of the species retained under subdivisions of his most extensive genus, *Eudyptes*, are more different from each other than they are from species of the other genera; and in this respect some change seems to be desirable. But in the determination of the species Mr. Gray is certainly wide of the mark; assuredly, there are not nineteen of them, as he gives. The list is much more useful as a guide to one's own research than as a model to be copied. At the same time, the synonymical discriminations are so accurately made that little or no confusion results from the redundancy of species. The only point concerning which we are at issue in the matter is that Mr. Gray relegates *chrysocome*, Forst., to *catarractes*, leaving his *pachyrhyncha* as the tenable name of a certain species, whereas we agree with Dr. Schlegel, that *chrysocome*, Forst., is different from *catarractes*, and is the prior name of what Gray calls *pachyrhyncha*. The following reductions in the list appear to be required:—

No. 10,806 to be united with No. 10,805.

No. 10,804 to be united with No. 10,803.

Nos. 10,802, 10,800, 10,799, 10,797 to be united with 10,790.

No. 10,794 to be united with 10,793, and one of the synonyms of 10,791 to be the name of 10,793. The valid numbers are therefore 10,790, 10,791, 10,792, 10,793, 10,795, 10,796, 10,798, 10,801, 10,803, 10,805, 10,807, 10,808.

1871. Hyatt, *Proc. Bost. Soc. Nat. Hist.* This is, we believe, the author's first appearance as an ornithologist; but he shows the trained naturalist here as elsewhere, bringing to bear upon the subject the same qualities that have distinguished him in another department of zoölogy. There is a certain freshness and originality in his treatment of the family that contrast by no means unfavorably with more conventional writings of practised ornithologists, and, in looking from a new stand-point, he has caught sight of some things that persons accustomed to the birds have looked at without seeing. This more than compensates for some slight deficiencies that, under the circumstances, we could not reasonably expect to find supplied. The article modestly professes to be simply a museum catalogue, but it possesses scientific claims of a very high order. The pterylographic data represent a valuable supplement to Nitzsch's earlier notice. So far as we know, Prof. Hyatt is the first naturalist who has attempted any critical discrimination of the various types of the *Spheniscidæ* with a view of determining their precise relationship, and especially their genetic relations to each other and to a probable ancestral stock; and this, we need not add, is work upon a higher plane than the mere identification of species, or preparation of descriptions and synonymy. We must refer to the paper itself for the details that we cannot here enter upon. It will suffice to say here, in heartily indorsing the author's plan of study and concurring in his general conclusions, that he shows better reasons for the genera he adopts than any one has hitherto given, and that our own studies of osteological structure, as far as these go, are emphatic evidence in favor of his views.

1872. GIEBEL, *Thesaurus Ornithologiæ*, *erster Halbband*, 390. In this work, an alphabetical catalogue of the nominal species, thirty-one in number, that were originally described under "Aptenodytes," is given, with the reference of each to its proper place. The determinations seem to be correct, with few exceptions. As the work has not progressed beyond the letter "A," the remaining names are not accounted for.

II. ON CERTAIN POINTS OF CRANIAL STRUCTURE BEARING UPON THE DETERMINATION OF THE GENERA.

Some authors have rested content with referring all the penguins to a single genus, adopting either the name *Aptenodytes* or *Spheniscus;* and there is some show of reason for this, in the fact that all the representative species are singularly interrelated in various points of form. But this is simply defining a genus upon the identical grounds that indicate the family. Others, going to the opposite extreme, have instituted or adopted a genus for every leading species, though in so doing they have been of course unable to assign characters of more than specific value. To reconcile these conflicting views, and, if possible, to fix this question of the genera with reasonable certitude, has been one object of the present investigation. I found that any division of the species according to the details of external form, as the size, shape, and extent of feathering of the bill, length of tail, presence of peculiar ptilosis, etc., would be, for the reason just alluded to, an elevation of various characters, properly to be regarded as specific, to generic rank; while the ignoring of these would force me to the other extreme of recognizing a single genus virtually equivalent to the family itself. It seemed to me that, if there were true genera among the penguins, the fact would appear from examination of internal structure; and, having a number of skulls at command, I directed my attention to these. As far as my material goes, the results of this investigation are to me highly satisfactory. At the same time, having examined the skulls of only a limited number of species, I cannot fix the generic status of all of them, nor even say how far, if at all, the skulls of the species not examined may show intergradation between the types of structure herewith detailed.

The skulls examined show *three* positively different patterns.

A. The first is that presented by *Aptenodytes pennantii.* The rostrum is much longer than the rest of the skull, attenuate, particularly narrow and acuminate. The nasal opening is correspondingly long and narrow. The upper prong of the nasal bone is anchylosed with the nasal prong of the premaxillary. The palatines are anchylosed with the maxillæ. The zygomata dip downward moderately from the maxillo-jugal suture. The mandible is not abruptly deepened in any part of its length, and shows a long narrow vacuity at the juncture of its symphyseal with the succeeding elements. The angle of the mandible lies directly below a perpendicular let fall from the mastoid. The interorbital space on the top of the skull is broad and smooth, since the rough depressions for the lodgment of the glands are narrow, and terminate before reaching the anteorbital prominences. The temporal fossæ are very shallow, widely apart, and merely separated by a slight bony ridge from the slight depression between themselves and the cerebellar protuberance. The greatest width of the skull is one-third, or less, of its entire length.

B. The second modification is afforded by the crested species (*Eudyptes* proper). (Pl. 4, fig. 1.) The rostrum is shorter or no longer than the rest of the skull, very stout, in particular extremely broad and obtuse. The nasal opening is correspondingly short. The upper prong of the nasal bone is partly or wholly free from the premaxillary. (Fig. 2.) The palatines are imperfectly anchylosed with the maxillæ. The zygomata are extremely curved, looping downward from the maxillo-jugal suture. The mandible is abruptly deepened at its middle into a broad plate, and shows no vacuity between the symphyseal and following elements. The angle of the mandible lies in front of the mastoid plane. The smooth interorbital space is narrow on top of the skull, since the glandular depressions reach the anteorbital prominences. The temporal fossæ are very shallow, widely apart, and merely separated from the depression between themselves and the cerebellar protuberance by a slight bony ridge. The greatest width of the skull is nearly half its length.

C. *Spheniscus demersus* shows a third modification. (Figs. 3, 4.) The rostrum is longer or no shorter than the rest of the skull, very stout, in particular extremely deep, with the apex hooked above, truncate below. The nasal opening is correspondingly short. The upper prong of the nasal bone is almost completely anchylosed with the premaxillary. The palatines are extensively anchylosed with the maxillæ. The zygomata are curved but slightly downward. The mandible is deepened very slightly and gradually, and shows no vacuity between the symphyseal and succeeding elements. The angle of the mandible is below, if not behind the mastoid plane. The smooth interorbital space on top is narrow or reduced to a ridge. The temporal fossæ are extremely deep, meet each other on the median line on top of the skull, and are completely isolated from the depressions on either side of the cerebellar protuberance by a strong flange-like plate of bone. The greatest width of the skull is about two-fifths of its length.

It will be observed that each of these types has its own peculiarities. Thus A stands alone in characters of the rostrum; C is isolated in the singularity of its temporal fossæ; B is peculiar in the dip of the jugal and depth of mandible; and the other characters vary in intensity of expression with each one. But there are in each case other characters that are shared with one other, but not with both the others; and it is these combinations that render the three distinct. I propose to establish genera upon them.

One skull of type B, of an undetermined species,[1] shows, among some peculiarities that I regard as simply specific, the presence of small and slender but perfectly plain basipterygoid processes, of which I see no trace in any other specimen.

As already intimated, I cannot say whether or not these cranial types shade into each other, or whether species not examined do not show something different from either of these three patterns, nor, finally, with which one of the three the unexamined species may agree. It seems to me that the species *minor* agrees so closely in external characters with C that its reference to the genus *Spheniscus* is warranted. For the same reasons, the species *antipodes* seems allied to B. In the uncertainty at present attaching to *papua*, *adeliæ*, and *antarctica*, it may be best to leave these to stand on their own merits in the genus "*Pygoscelis*," which, however, can then only be characterized by the extreme length of the tail and the feathering of the bill, since the form of the bill differs greatly in each of the three. These genera would correspond very nearly with the sections Dr. Schlegel has indicated, and are exactly those of Prof. Hyatt. The latter has shown how difficult it is to define the genera, seeing that they vary with whatever character we take as our guide. On the whole, I think it most probable that no more than three genera will be finally determinable, namely, *Aptenodytes*, *Eudyptes*, and *Spheniscus*, though the second of these may contain subgenera, based upon shape and feathering of the bill, presence or absence of crests, and length of tail.

The cranial characters just described will be readily appreciated by reference to the accompanying figures (Fig. 4), kindly drawn for this paper by my friend, Prof. Morse. It was not thought necessary to give a figure of Aptenodytes, as a beautiful engraving has already been presented in Prof. Brandt's invaluable article. These figures are all of two-thirds size; those representing vertical views show the skull from above, on the one side, and from below (with the mandible removed) on the other side, of the median lengthwise line.

In its general characters the skull conforms to the ordinary pygopodous type. The palate is schizognathous. The interorbital septum has a large vacuity; its thickened lower border curves gently forward and upward. The vomer is slight and readily detached. The optic foramina are merged in a large vacuity; the foramina in front of the ear are large and distinct. The mastoid and postorbital are both prominent; the depressions for lodgment of the gland are well marked. The pterygoids are remarkable for their breadth anteriorly, forming somewhat triangular laminæ, instead of irregular cylinders of bone. The palatines are large, very broad posteriorly, and thin. The maxillo-palatines, on the other hand, are very small and simple. The very large and irregular lachrymals are permanently free from surrounding bones, and seem to be usually (but not always) fenestrated with a large foramen. A prominent peculiarity of the skull is the loose connection of the bones of both jaws. The nasals are never entirely confluent with either maxillaries or premaxillaries, and they are sometimes distinct throughout. The posterior ends of the median prongs of the premaxillaries commonly remain distinct from the nasals embracing them, and frequently are not even anchylosed with each other. Traces of the maxillo-premaxillary, maxillo-palatal, and maxillo-jugal sutures are usually very plain; and in the lower jaw, most of the original elements remain more or less distinct throughout life. None of the cranial bones appear to be pneumatic.

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[1] It seems to be *not* one of the crested species, and I suspect that it is "Dasyrhamphus" *adeliæ*, but there is no certainty about this.

An incomplete skeleton of *Aptenodytes pennantii* furnishes the following additional osteological data (Pl. 5; figs. all of nat size):—

All the bones of the wing are flat and solid.

The *humerus* (Fig. 5), about 4½ inches long, has an average width of an inch, and a thickness of about ¼ of an inch. It is perfectly laminar, except the globular expansion at its head. This portion lies oblique to the general axis of the bone, the general convexity of the articular surface presenting inward and backward. The whole of this expanded surface is, in effect, the dome roofing over an immense antrum, into which the whole end of one's finger may be thrust. The articular surface is somewhat crescentic in general outline; anteriorly it slopes to the prominence representing the "greater tuberosity," which is directly continuous with the front edge of the bone. Inside this ridge there is a deep groove, and along the inner border of the articular surface lie two fossæ separated by a ridge. But the distal extremity of the bone is still more peculiar—showing a characteristic of the family only shared, to a certain extent, by *Alca impennis*. (Fig. 6). The bone is cut off obliquely, at an angle of about 45°, with a straight edge. The anterior three-fifths of this is occupied with the two facets for articulation with the bones of the forearm. These facets are continuous, and the radial one scarcely shows the particular elliptical shape common among birds. The posterior extremity of this oblique end of the humerus is prolonged far beyond the true elbow joint, furnishing a resting place for the two large anconal sesamoids. The very end is deeply grooved, and another similar groove is impressed upon the bone on the outside, a little higher up. The sesamoids are in these grooves. The structure of the elbow is such as to allow but very restricted motion; the forearm can be flexed out slightly from its usual position of nearly complete extension.

The larger, outer one of the two sesamoids is an irregularly discoidal bone, with a smooth, flat, external face, and curved outer border; its sharpened edge fits in the upper of the two grooves at the extremity of the humerus; the prominence of the humerus that defines this groove abuts against a slight excavation on the outer surface of the sesamoids. The smaller sesamoid lies a little behind and inside the other; it has one flat face applied against the surface of the other, an irregular surface with a central ridge fitting into the extreme groove of the humerus, and a long, curved, postero-external free border. These sesamoids, borne upon the most projecting point of the humerus, afford an extremely powerful leverage for extension of the forearm.

The ulna and radius are similar to each other in general appearance, both being laminar, like the humerus, with a sudden thickening and constriction at the proximal extremity, so that the articular facets are irregularly circular. The distal extremity of the ulna is pretty effectually divided into two facets, a posterior excavation in which the head of the ulnare articulates, and a superior prominence abutting against a surface of the radiale. The distal extremity of the radius shows a single convex articular surface fitting the concavity of the radiale. The outer surface is obliquely impressed for a long distance with a distinct groove for a tendon; the anterior margin of the radius is a straight, sharp crest, more prominent than the opposite edge of the ulna. The two bones of the forearm have very intimate relations to each other only at their proximal extremity, being barely in mutual contact at the wrist; but in consequence of their straightness, their edges lie parallel in the continuity—not presenting the elliptical interspace commonly seen in birds' forearms.

The radiale is not specially noteworthy (Fig. 7), being a simple, somewhat cubical nodule with distal and proximal articular concavity for the metacarpus and radius respectively, another articular face for the protuberance of the ulna, two free faces, and an anterior extremity for tendinous attachment. The ulnare, on the other hand, is of extraordinary, if not unique, shape and size. It develops an immense lamellar expansion of the curious shape shown in the figure, the real body of the bone appearing as a mere process wedged in betwixt the ends of the ulna and metacarpus. If, as I presume, the flexor carpi ulnaris has its customary insertion into this bone, the increase of leverage must be enormous.

The single metacarpal bone is peculiar in several respects. It bears no pollical phalanx, and the crest that ordinarily indicates, in the composition of this bone, the originally distinct radial metacarpal is here obscure, not being differentiated to any considerable degree from the general laminar expansion. The ulnar metacarpal has no convexity; its fusion with the main metacarpal is perfect for nearly its proximate half, and again at the distal extremity—a narrow linear fenestration separating it in the rest of its extent. The head of the bone represents one continuous articular surface for the radiale and ulnare, flat sideways, strongly convex fore and aft. At the distal extremity, however, there are two perfectly distinct articular facets—an oval one for the radial phalanx, and a small circular one for the ulnar phalanx. The bone is nearly three inches long, and rather less than one-third as broad.

The proximal radial phalanx is a straight, flattened, rectangular blade of bone, with four sharp corners, a sharp anterior and posterior border, and an oval articular surface at either end. It is two inches long and half an inch broad. The distal phalanx is simply a flattened spur, with sharp edges, tapering to an obtuse point; it is about half an inch long. The ulnar digit, however, is of unusual size, reaching beyond the end of the proximal radial phalanx. It has a stout head, whence a process is developed, and then tapers regularly to the end. It is less obviously flattened than the other bones of the hand.

The bones of the leg conform closely to the general pygopodous type. The patella, however, is of immense size, and of an indescribable, irregular shape. According to Owen, it develops from two centres—a matter interesting in connection with the presence of two sesamoids in the elbow. The tibia is a bone about eight inches long, and nearly cylindrical in its continuity. It closely corresponds, in general, with the same bone of a loon, for example, except that it does not develop the long apophysis above the knee-joint. There is a considerable protuberance, however, above the plane of the articulation, formed by the extension of two sharp cnemial ridges that meet above, defining a long deep fossa that lies between them. The distal extremity offers nothing peculiar; the osseous bridge for confinement of the flexor tendons is perfect, and the trochlear surface has the usual configuration. The fibula is six inches long, and extremely slender from above the middle downwards. It abuts against the tibia at both ends, and also for about an inch of its length at a place nearly half-way down. Elsewhere, the interspace between the two bones is considerable.

The ankle-joint has a peculiar free, persistent ossicle, about the size and shape of a split pea. It appears to be a sesamoid, and it lies on the posterior aspect of the joint; but owing to an unfortunate inadvertence in the preparation of the specimen, its exact position and relations were not made out.

The tarso-metatarsus (Fig. 8) is the most remarkable bone of the skeleton in several respects, and the one more particularly diagnostic of the family. Penguins afford probably the only instances, among recent birds, of width crosswise being decidedly greater than thickness antero-posteriorly, and more than half the length; and the only case of persistence throughout life of fenestræ marking the composition of the bone of three originally distinct metatarsals. In the present species, the bone is rather under two inches long, from an inch to one inch and a third wide at different points. The front shows two deep grooves lengthwise from one end to the other, and in each of these grooves there is an oval perforation, that would about admit the passage of a goose-quill. Behind, the corresponding grooves are nearly obsolete. The proximal extremity is an uninterrupted articular surface for the tibial condyles, the inner impression being much the more strongly marked. The distal extremity is deeply cleft in two places, the three metacarpal prongs being completely isolated. The central one of these projects beyond the lateral ones. The articular faces have the usual contour; all being grooved perpendicularly, and the lateral ones showing that ordinary but highly interesting kind of obliquity, by means of which the toes, when flexed, are brought side by side, and made to diverge from each other when extended.

In the dried bone, no special surface for attachment of the accessory metatarsal can be recognized. The first digit is extremely small, completely lateral, closely joined with the base of the second toe, and appears in its usual position during life to be turned more or less completely forward. Technically, it may be considered "elevated," though the disparity in size between these and the other toes is so great that it is difficult to say how much, if any, above the plane of the rest it is really situated. It appears to have little or no functional importance, although all its bones are present and morphically perfect. The accessory metatarsal is a straight, slender bone, about half an inch long, irregularly flattened; the proximal phalanx is similar but still smaller, while the distal phalanx is a mere spiculum about a fourth of an inch long.

The other three toes are of ordinary size; the middle one exceeds the outer a little, while the inner is considerably the shortest; all show the normal number of phalanges (3-4-5, from 2d to 4th). The phalanges of each toe, as usual, decrease in length and bulk from first to last, and the corresponding ones of different toes bear to each other the usual relative size. The distal phalanges have enlarged processes for the support of the heavy, blunt claws, and these processes are deeply grooved on each side.

III. ON THE GEOGRAPHICAL DISTRIBUTION OF THE FAMILY.

It is well known that the penguins are entirely confined to the southern hemisphere, and their northern limit of dispersion is probably ascertained with approximate accuracy. Their nearest approach to the equator seems to be on the coast of South America. According to Meyen, the *S.* "*humboldtii*" (*demersus*) is abundant in the harbor of Callao, Peru, lat. 10° S.; while this *Spheniscus* reaches on the other side of this continent to Southern Brazil, and Ascension Island, lat. 8° S. (*Licht.*). Dr. Schlegel places the African limit at 25°, and the Australian at 35° S., properly ignoring the accounts of Sonnerat, whose representations of the occurrence of penguins, as given in his "Voyage," are in all probability erroneous. On the other hand, some species of penguins have been found apparently as far as voyagers have penetrated toward the pole. Such highly antarctic species are the *Pygoscelis adeliæ*, and *antarctica*, named from their habitat, and the *Aptenodytes patachonica*, seen by Peale in lat. 66° 52′.

The Falkland Islands appear to be a centre of the family, no less than half of the known species occurring there.

A number of the species are very extensively dispersed, having, as it were, a circumpolar mode of distribution. Such are some of the crested species, the "papuan" penguin, and especially the *Spheniscus demersus*. This last appears to have the most extensive distribution, both in latitude and in longitude, of any; and since it varies, like other birds, with a change of habitat, this may account for the exceptional number of nominal species that have been established at its expense. As far as is known, two species constitute an exception to the general rule, being confined to a comparatively limited area; these are the *Spheniscus minor* and *Eudyptes antipodes*, inhabiting the Australian region.

As Dr. Schlegel remarks, the precise habitat of each species cannot be given as yet; and this will not be possible without much more information than we now possess, respecting the places where the different species propagate, and especially in regard to their movements, whether irregular and contingent, or periodical, according to season of the year.

CLAVIS SPECIERUM SPHENISCIDINARUM.

CRISTATÆ —*flavifrons* . . . . E. DIADEMATUS.
—*nigrifrontes*—brevicaudata—parvirostris—fusco-coerulescens . E. CATARRHACTES.
—*longicaudatæ*—magnirostris—coeruleo-fuscescens E. CHRYSOCOME.
—parvirostris—fusco-coerulescens . E. CHRYSOLOPHA.
ECRISTATÆ—*flavotinctæ* —brevirostris . . . . E. ANTIPODES.
—*longirostres* —nudipes . . . . . A. LONGIROSTRIS.
—plumipes . . . . . A. PATAGONICA.
—*non flavotinctæ*—albocoronata . . . . P. TAENIATA.
—*nigrocoronatæ*—albogulares —torquata . P. ANTARCTICA.
—etorquata . S. MINOR.
—*nigrogulares*—nudirostris . S. DEMERSUS.
—plumirostris . P. ADELIAE.

IV. DETERMINATION OF THE SPECIES.

APTENODYTES PATAGONICA, Forst.

Aptenodytes patachonica, FORST., Comm. Soc. Reg. Sc. Götting. iii. 1781, 137, pl. 2. GM., S. N. i. 1788, 556 (in part: confounds the two species). LATH., Ind. Orn. ii. 1790, 878 (in part: same as Gmelin's).
Spheniscus patagonicus, SCHLEG., Mus. P.-B. livr. 9me. 1866, *Urin*, p. 3.
Aptenodytes forsteri, GRAY., Ann. Nat. Hist. 1844, 315; Handl. iii. 99.
Aptenodytes imperator, BONAP.
Pennant, Gen. of B. pl. 14; T. F. Miller, Ill. Nat. Hist. pl. 20.
Habitat.—Maribus antarcticis.

Maximus inter omnes; maxillâ ultra medium ptilosâ, tarsis antice lateribusque mandibulæ magnâ ex parte ptilosis; rostro pedibusque crassiusculis pro genere Aptenodytis, unguibus maximis obtusissimis: notæo nigro et cœruleo permixto, gastræo albo, gulâ nigricante, ea pictura infrâ cordiforme; lateribus colli flavicantibus, summâ parte flavissimâ, necnon striâ nigra humeris anteducta notatis, rostro pedibusque nigris, lateribus mandibulæ erubescentibus.

Mus. Smiths. No. 15,666, adult, taken January 23, 1840, in lat. 66° 52′ S., long. 150° 25′ E. from Greenwich; H. Eld, U. S. Expl. Exped.: basis of *Peale*, pp. 258, 335, sp. No. 691, and of *Cassin*, pp. 349, 450, sp. No. 681. This specimen, as mounted, stands about 3½ feet high, but appears somewhat overstuffed; wing 14 inches, tail about 3, bill along culmen 3, along gape almost 5, from antiæ to tip of bill 2. The bill is feathered beyond its middle, the antiæ reaching more than half-way from angle of the mouth to tip, and these feathers conceal the maxillar tomia for a great distance. On the under mandible the feathers completely fill the interramal space, and also cover much of the side of the lower mandible, leaving, towards the base, only the expanded and colored edge of the mandible naked. The tarsi are entirely covered with feathers, which furthermore overlie the toes for some distance; but only a part of the tarsus is implanted with feathers, the rest being reticulate with small six-sided plates, as are also the upper surfaces of the toes, except just at the end, where there are 2–3 annular scales. The hallux is minute, relatively smaller than in any other species, and almost perfectly antrorse; the lateral toes are sub-equal to each other, but the 2d is a little shorter than the 4th; the tips of the claws of both overreach the base of the 3d claw. Claws enormously stout and blunt; 2d 1.20, 3d 1.50, 4th 1.25 long. This bird appears to be in perfect plumage; the upper parts are intimately mingled black and blue, but the latter gives the general impression; the black of the throat is short, and ends abruptly with a broad cordiform outline below; the forepart and sides of the neck appear to have been yellower than they are now, but the club-shaped upper termination of this colored area is still very yellow; in the whitish of the sides of the neck stands an isolated black stripe, running upward from the shoulder, stopping abruptly, not reaching the gular black. The wings are entirely white beneath. The under mandible is still richly colored posteriorly; the rest of the bill, and the whole feet and nails, are black.

APTENODYTES LONGIROSTRIS, Scopoli.

Patagonian Pinguin, Pennant., Phil. Trans. lviii. 1768, 91, pl. 5. Lath., Gen. Syn. vi. 563; Gen. Hist., x. 390; in part: confuses both species.

Aptenodytes patagonica, Pennant.

Aptenodytes patachonica, Gm., S. N. i. 556 (in part; confounds the two species.) Lath., Ind. Orn. ii., 1790, 878 (same as Gmelin's).

Pinguinaria patachonica, Shaw., Nat. Misc. 1799, xi. pl. 409 (nec Forst.).

Aptenodytes longirostris, Scopoli; Sonn., Voy. N. Guin. 180, pl. 113.

Aptenodytes pennantii, Gray, Ann. Nat. Hist. 1844, 315; Gould, P. Z. S. 1859, 98; Scl., Ibid. 1860, 392. Hyatt, Pr. Bost. Soc. N. H. 1871.

Spheniscus pennantii, Schlegel, Urin. M. P.-B. 1866, 3; Schlegel, De Dier. p. 268.

Aptenodytes rex, Bonap.

Woolly pinguin, Lath., Gen. Hist. x. 1824, 292, pl. clxxxi.; young in the down (also, "hairy pinguin," ibid.?).

Pl. Enlum. No. 975 (shows unmistakably the side of the under mandible entirely naked).

Habitat.—Maribus australibus. Ins. Falklandicis, Kergueleni, Stewartii.

Apt. patachonicæ similis, sed multo minor, rostro artubusque pro staturâ longioribus, tarsis lateribusque mandibulæ omnino nudis, unguibus gracilioribus; notæo nigro et cœruleo permixto, gastræo albo, gulâ nigricante, ea picturâ infra aculeatâ, lineâ flava jugulari media summâ parte furcatâ, picturam nigram gularem inter ramos suos amplectante, deinde per latere utroque colli porrectâ et illic maculam flavissimam formante; rostro pedibusque nigris, mandibulâ nigrâ ex parte erubescente.

Mus. Smiths. No 59,243, in perfect plumage; from the Falkland Islands. Skin a yard long, but somewhat stretched; probably was about 30 inches in life; wing about 12; tail 4; tarsus, measured in front (where all our other measurements of tarsi are taken), 1.50; middle toe and claw 4; culmen of bill 3.25; gape 4.50; from antiæ to tip of bill 2.50. While a much smaller bird than *patachonica* (*Forsteri*), it is thus seen that the wings, tail, and feet are relatively longer, and that the bill, besides being relatively longer, is actually made of equal length, if not absolutely longer, in consequence of the less extent to which the feathers of the front encroach upon the upper mandible, the antiæ falling short of half the distance between angle of the mouth and tip of the bill. Another and yet stronger character is, that the sides of the under mandible are entirely naked, whereas in *patachonica* (*Forst.*) the feathers encroach so much that hindwards only the tomial edge of the mandible remains bare. This difference heightens the seeming greater size of the bill of *pennantii;* it likewise makes the brightly colored area larger, and gives it a different shape. The tarsi of *pennantii* are entirely naked, and not even hidden by the tibial plumes; whereas in *patachonica* (*F.*) the tarsi are largely ptilose, and wholly hidden by feathers, as are also the bases of the toes. The general *pictura* of the plumage is the same; but the neck shows a very noticeable difference, the gular black running far down in a sharp point embraced betwixt the forks of the narrow median anterior jugular line of yellow that after bifurcating mounts on either side of the neck and head, there to form a large very yellow spot, bounded immediately by the dark color of the neighboring parts; and moreover, the isolated black line running up in the whitish of the side of the neck from the shoulder towards the throat, as observed in the Smithsonian specimen of *patagonica*, is not seen here.

I am not satisfied, however, that these precise points of coloration are sufficiently distinctive of the species as compared with its congener. It is probable that the only reliable characters are to be found in the larger size, proportionally shorter members, much more extensively feathered bill, and feathered tarsi, of *patagonica;* and all these points seem to be accounted for by a difference in habitat, *patagonica* being more decidedly antarctic than *longirostris*.

No. 11,976. Mus. S. I. (*Osteological Register.*) From the Falkland Islands, received through Mr. Salvin, with No. 59,243.

No. . . . . Mus. Acad. Philada. No locality given. Bill from forehead 3.75, from nasal feathers 2.75, from gape 5.25. Tarsus, middle toe, and claw together, 6 inches; wing from the shoulder 1 foot. A fine specimen, in perfect plumage. The intense yellow club-shaped spots mount to the very summit of the occiput, being there separated only about one inch from each other. They are bordered behind by a sharp narrow black edging, distinctly defined against the neighboring blue; this black margin nearly meets its fellow on the front of the neck, then passes down along the edge of the blue on each side, widening as it descends beyond the wing where it is finally dissipated.

No. . . . . Mus. Acad. Philada. No locality recorded; in perfect plumage, but the bright tints not so vivid as in the preceding. Bill from forehead 3.75, along side of lower mandible 5 inches.

No. . . . Mus. Bost. Soc. Straits of Magellan, Coll. La Fresnaye. (*Hyatt.*)

PYGOSCELIS TÆNIATA (Peale).

Le manchot papou, SONNERAT, Voy. 181, pl. 115.

Papuan Pinguin, LATH., Gen. Syn. vi. 565, and Gen. Hist. x. 388.

Aptenodytes papua, FORST., Comm. Soc. Reg. Götting. iii. 1781, p. 140, pl. 3. BONNATERRE, Ency. Method. i. 1782, p. 67, pl. 17, f. 3. GM., S. N. i., 1788, 556. LATH., Ind. Orn. ii., 1790, 879. VIEILLOT, Gal. Ois. pl. 299. GRAY, Voy. Ereb. and Terr. pl. 25.

Eudyptes papua, CASSIN, Orn. U. S. Expl. Exp. 1858, 264. Gould, P. Z. S. 1839, 98.

Spheniscus papua, SCHLEGEL, Urin. M. P.-B. iii. 1866, 5.

Eudyptes (*Pygoscelis*) *papua*, GRAY, Handl. iii. 1871, 98.

Pygoscelis papua, HYATT, Proc. Bost. Soc. N. H. 1871, p.

Aptenodytes tæniata, PEALE, Orn. U. S. Ex. Ex. 1848, 264.

Pygoscelis wagleri, SCLATER, P. Z. S. 1860, 392, No. 46.

"*Pygoscelis papuensis*, VAN DER HOEVEN." (*Gray.*)

Habatat maribus australibus. Ins. Falklandicis, Kergulenii, Macquarii. Nec. Ins. Papua, unde patet, nomen Scopolianum ineptum.

Staturâ medius; notaeo cum capite gulâque griseo-nigro, cœruleo-tincto, gastræo albo, vertice transversim albo-lunato, alis albo-marginatis, caudâ elongatâ, cuneatâ, rectricibus sexdecem, exterioribus albo-marginatis.

May be known at a glance, by the white semilune across the crown from one eye to the other, long tail (about as in *adeliæ*), and long slender much feathered bill, approximating to that of *Aptenodytes.*

No. 2282, Mus. Acad. Phila., adult, " Iles Croquets." Stands 25 inches high, but may be stretched. Tail about 5½ inches, the outer feathers white-edged. Middle toe and claw 3.40. Tarsus quite naked, a little over an inch long. Wing 9 inches, the posterior border broadly white. The bill of this species stands quite alone among the penguins, saving *Aptenodytes*, in its length and slenderness and in the length combined with narrowness of the frontal antiæ. Whilst the culmen measures 2.75, the distance from the nasal feathers to the tip of the bill is only about 1.60; the nostrils are completely hidden, and not easy to discover in the dried state. The bill is really longer than it looks, the rictus measuring 5 inches; the progression of the feathers on the bill is a condition essentially similar to that of *adeliæ;* although the bills of the two look so different, this is merely due to the length of the terminal part in *tæniata*. If the terminal portion were cut off an inch, the bill of *tæniata* would be essentially similar to that of *adeliæ*. Sharing other features, especially the very long tail, *adeliæ* and *tæniata* seem to be most closely related species; and despite the difference in the bill, I think that the skulls of the two will be found of a single pattern. Some ornithologist will do good service by noticing the skulls and seeing whether they agree, and if so, how they compare with the three types of cranial structure. I am induced to surmise that the resemblance will be found closest with *Aptenodytes*.

No. . . . Mus. Acad. Philada. No locality recorded. In this specimen, apparently not quite mature, the fore half of the body above is gray, in decided contrast with the blue-blackish of the rest. The coronal crescent is evident. The bill appears to have been clear yellow, with black ridge and tip.

No. . . . Mus. Smiths. Inst. U. S. Expl. Exped., H. Eld, from Macquarie's Island, where Mr. Peale says (l. c.) it was found breeding in abundance, in January, with Crested Penguins.

No. . . . Mus. Bost. Soc., no locality given, Coll. La Fresnaye (*Hyatt*).

Dr. Schlegel quotes the Falklands, voyage of the Astrolabe and Zélée; Mr. Gray, also, Kerguelen's Island.

PYGOSCELIS ADELIÆ (H. & J.).

Catarractes adeliæ, HOMB. and JACQ., Ann. Sc. Nat. 1841, 320.
Dasyrhamphus adeliæ, HOMB. and JACQ., Voy. P. S., Ois. 1846, pl. 33, f. 1.
Eudyptes adeliæ, CASSIN, Orn. U. S. Ex. Ex. 1859, 352, 450, No. 685.
Spheniscus adeliæ, SCHLEG., Mus. Pays.-B. Urin. 9me. livr. 1866, 4.
Eudyptes (*Dasyrhamphus*) *adeliæ*, GRAY, Handl. iii. 1871, 99.
Pygoscelis adeliæ, HYATT, Proc. Bost. Soc. N. H. 1871, p. —.

Pygoscelis brevirostris, GRAY, Voy. Ereb. and Terr. Birds, pl. 28.
Aptenodytes longicauda, PEALE, U. S. Ex. Ex. Birds, 1848, p. 261, pl. 70, f. 2; p. 335, No. 696.
Eudyptes herculis, FINSCH, P. Z. S. Lond. 1870, pl. 25. (Juv.)

Habitat.—In maribus antarcticis: Adelia. Victoria.

Staturâ medius, caudâ longissimâ, cuneatâ, rectricibus linearibus, rostro brevi, crasso, recto, obtuso, ultra medium ptiloso, apice adunco, naribus plumis obtectis, palpebrarum marginibus nudis, flavis; notæo fusco, cœruleo-lavato, capite cum gulâ obscurioribus.

No. 15,698, Mus. Smiths., adult in perfect plumage, mounted; from the Antarctic Ocean, lat. 64° 40′ S., long. 103° 4′ E. from Greenwich, U. S. Expl. Exped., T. R. Peale: *type of Aptenodytes longicauda*, *Peale*, *l. c.*, and basis of Cassin's article, l. c. The tail is very long, the central feathers being upwards of 7 inches, though the lateral are only about 2, in consequence of the extreme graduation; all the rectrices are merely narrow linear laminæ, like pieces of whalebone with frayed edges. The tibial feathers cover the tarsus in front, but none grow on the tarsus itself, which is very short—only about an inch. Middle toe and claw 3.00; inner do. 2.25, outer do. 2.50; nails very long, but blunt; webs emarginate. The podotheca is entirely reticulate, except a few annular scales at the ends of the toes. The bill is very short, narrow and deep, and densely feathered beyond its middle. The antiæ reach within an inch of the tip, entirely covering the nostrils; the broad rounded-depressed and decurved culmen runs in a point on the forehead; its chord is 1.50 long. The feathers of the antiæ, and those between the mandibular rami, slope so obliquely and rapidly towards the edges of the bill, that the naked portion of the tomia is only 1.75 inches long, though the whole gape measures 2.50; the feathery extension in the interramal space is within .75 of the tip of the mandible. Depth of bill at base over .90. The short nasal groove is very narrow and oblique, running into the tomia behind the hooked portion, and behind widening into a feathered fossa where the nostrils lie. This specimen, as mounted, now stands a trifle over 2 feet high, but measures about 33½ inches (its length in the flesh was 31 inches—*Peale*). The bill is wholly dark colored—probably it showed some reddish in life; the feet appear to have been flesh-colored. The naked edges of the eyelids are yellow. The upper parts are fuscous, only slightly lightened with penguin-blue, of which each feather shows a trace; the whole head and upper throat are uniform smoky blackish-brown.

No. 15,667, Mus. Smiths., adult, mounted, same locality as the last, and perfectly similar: another example of *Apt. longicauda*, Peale.

No. 793, Mus. Acad. Phila., adult, ♂, "Iles Adelaides." Entirely similar to the foregoing. Tail 6.25 inches. I count 15 rectrices, and probably there were 16; none are white-edged in this species as in *tæniata*.

No. 2191, Mus. Acad. Phila., "New Zealand?" Very similar to the last; but apparently not quite adult, as the bill is weaker, and there are white specks in the dusky part of the throat.

No. 793*bis*, Mus. Acad. Phila., received with No. 693, and from the same locality. An immature bird, in the plumage of "*Dasyrhamphus herculis*." The throat is white to the bill, but there are a few scattered blackish feathers, showing incontestably that this part would have become dark.

Although we repose great confidence in the judgment of the accomplished ornithologist who lately proposed to separate from *adeliæ* a specimen in Count Ercole Turati's collection, yet we cannot hesitate to refer *E. herculis* to this species, even without examining the type. For according to Dr. Finsch's own showing, the only tangible difference lies in the white throat, which is surely a mark of immature plumage, however adult the specimen may otherwise appear. Every one of the black-throated penguins (all the family except *minor* and *antarcticus*) have the throat white at first; and in several cases we have actually traced the change, by insensible degrees. The British Museum examples, with white throat, lately printed by Mr. Gray as "*herculis*," were never suspected to be aught else than young *adeliæ*, before Dr. Finsch's article appeared. Dr. Schlegel reports a precisely similar "individu au premier plumage, de taille moins forte et offrant la gorge blanche, terre Victoria, acquis in 1863;" and we recognize the same condition in this one of the Academy's specimens.

The *Aptenodytes longicauda* of Peale was promptly identified with *adeliæ* by Cassin; and Mr. Gray soon recognized the same species in his *Pygoscelis brevirostris*.

PYGOSCELIS ANTARCTICA (Forst.).

Antarctic Pinguin, Lath, Gen. Syn. vi. 565, and Gen. Hist. x. 389.
Aptenodytes antarctica, Forst., Comm. Soc. Reg. Sc. Gött, 1781, iii. 141, pl. 4. Gm., S. N. L. 1788, 557. Lath., Ind. Orn. ii. 1790, 879.
Eudyptes antarctica, Gray, Voy. E. and T., Birds, pl. 26.
Pygoscelis antarctica, Bonap. Hyatt, Proc. Bost. Soc. 1871.
Spheniscus antarcticus, Schleg., Urin. M. P.-B. iii. 1866, 5.
Eudyptes (*Pygoscelis*) *antarctica*, Gray, Handl. iii. 1871, 99.

Habitat.—Maribus aust. et antarct. Ins. Falklandicis, Weddelii.

"Taille au dessous de la moyenne. Bec petit. Se distingue de toutes les autres espèces par le blanc occupant non seulement toutes les parties inferièures jusqu'au menton, mais encore les côtés de la tête jusqu'a l'occiput et le bas des freins, et parceque ce blanc n'est interrompu que par une raie noire entourant le devant de la gorge, traversant les joues, et se dirigeant sur le devant de la nuque. Bec noirâtre. Pieds rougeâtres." (Schl.)

"Length 21 to 22 inches; tail 4½ to 5⅙ inches; wing 7½ inches; tarsus 29 to 30 lines; middle toe 2 inches; bill (along the side) 27 to 28 lines; from the forehead 18 lines; height 7½ lines." (Schlegel.)

We have not seen this strongly marked species, and we are not aware that there is more than one specimen in the United States. This is in the Boston Society's Museum, and is an adult, from the La Fresnaye Collection; no locality assigned. (*Fide Hyatt.*)

The foregoing description is copied from Dr. Schlegel, who quotes two specimens in the Leyden Museum, from the Falkland and Weddell's Islands (Voyage of the Astrolabe and Zelée).

In the length of tail, feathering of the bill, and some other characters, it seems related to *tæniata* and *adeliæ*, and to be referable to the genus *Pygoscelis*. It forms, with *S. minor*, an exception to the general rule of coloration among penguins, in that the throat persists white.

EUDYPTES ANTIPODES (H. & J.).

Catarrhactes antipodes, Hombr. and Jacq., Ann. Sc. Nat. 1841, 320. Id., Voy. au Pôle Sud de l'Ast. et Zélée, pl. 33, f. 2.
Eudyptes antipoda, Gray, Voy. Ereb. et Terr. pl. 27. Cass., Ornith. U. S. Ex. Ex. 1859, 351, 450, No. 684.
Pygoscelis antipoda, Bonap.
Spheniscus antipoda, Schleg., Urinatores Mus. Pays-Bas, 9me, 1866, 9.
Eudyptes (*Pygoscelis*) *antipoda*, Gray, Handl. iii. 1871, 99.
Aptenodytes flavilarvata, Peale, Orn. U. S. Ex. Ex. 1848, p. 260, pl. 70, f. 1; p. 335, No. 695.

Habitat.—Ins. Aucklandicis, Campbelliana.

Staturâ medius; ecristatus, sed plumis capitis elongatis, linearibus; rostro brevi, crassiusculo, recto, apice maxillæ adunco, mandibulæ subtruncato; caudâ brevi, rotundata; suprâ griseo-cœruleus dilutior, infra albus, sed gulâ, necnon lateribus colli summi eapitisque infimi brunnescentibus; plumis elongatis genarum flavicantibus, verticis flavicantibus nigro-lineatis, fasciis transocularibus in occiput conniventes flavioribus; rostro pallide incarnato.

No. 15,655, Mus. Smiths., mounted, adult, ♂ in nearly perfect plumage, from the Auckland Is., U. S. Ex. Ex., T. R. Peale: *type of Apt. flavilarvata Peale, l. c.;* basis of *Cass. l. c.* There are no true lateral crests as in the typical species of *Eudyptes*, but all the feathers of the face, and most of those of the crown, are lengthened and linear. The yellow of the cheeks and crown has a dull soiled shade, and that of the crown is sharply streaked with fine black lines, one on each feather; the unlengthened feathers of the hind head, and those over the auriculars and through the eyes, form a well-marked band of much brighter and purer sulphur yellow; the lower parts of the head, and uppermost of the neck, including the throat, have a peculiar brownish cast; and, altogether, the head markings are unique in the family. The under parts are white, up to the slight gular brownish just mentioned; the upper parts are of a pale watery blue, more dilute than on an average among the other species. The head markings, and lengthened feathers of the vertex, together with the points of form here to follow, show how the species is a link between true *Spheniscus* and typical *Eudyptes*. Bill stoutish, straight, tip fairly hooked, but under mandible hardly truncate, nasal sulcus as usual. The antiæ run out pointedly, about $\frac{1}{3}$ of an inch beyond base of culmen, but still do not conceal the nostrils; from their apices, the feathers rapidly retreat, to angle of the mouth, leaving the maxillar tomia entirely bare, while those on the under mandible similarly expose the whole tomia, although between the rami they reach within less than an inch of the end of the bill. Chord of culmen 2.10; depth of bill .85; antiæ to tip 1.75; gape 3.00: the anterior canthus is just over the angle of the mouth. Tail very short (under 2 inches), and much rounded, as in *Spheniscus demersus* or *minor*. The whole length of the bird is somewhat over 2 feet.

Schlegel reports one of the types of the species from the

"Océan Glacial Austral, Voyage de l'Astrolabe et de la Zélée." According to Gray, the British Museum examples are from the Auckland and Campbell's Islands. Judging from Mr. Peale's account, the Aucklands are a headquarters of the species.

The *Aptenodytes flavilarvata* of Peale was long ago referred by Cassin to its proper place.

EUDYPTES CATARRHACTES (Forst.).

Phaëton demersus, L., S. N. i. 219, nec *Diomedea demersa*, ibid. 214. Based on Edw. 49, and Briss. vi. 102.

Aptenodytes catarractes, FORST., Comm. Soc. Reg. Sc. Gött. iii., 1781, 145. GM., S. N. ii. 1788, 558, No. 7: based on Edw. 48 = Linnæus's and Forster's bird.

Spheniscus catarractes, SCHLEGEL, M. P.-B. 9me. livr. 8.

Eudyptes catarractes, GRAY, Handl. iii. 1871, 98.

Pinguinaria cristata, SHAW, Nat. Misc. pl. 437.

———— "*saltator*, STEPH.," (Gray.)

Aptenodytes gorfua, BONNATERRE, Ency. Method. 1782, i. 68.

"*Aptenodytes chrysocome?*" PEALE, Orn. U. S. Ex. Ex. 1848, p. 259, 335, No. 693 (testibus specim. ipsis).

?Le manchot huppé de Siberie. Planche Enlum. No. 984.

Obs. This species is at once distinguished among the crested ones by the shortness of the tail, which in size and shape rather recalls *S. demersus*. This member is under three inches long, rounded, of fourteen narrow stiffish graduated rectrices. From either *chrysocome* or *chrysolopha* it is also known by its inferior size; and from *chrysocome*, its nearest ally, by the quite blue upper parts, as in *chrysolopha*, the color of the back of *chrysocome* being quite dark.

This appears to have been the earliest described of the crested species, and its synonymy is in such a state of confusion with that of the following, that probably it is now impossible to completely unravel it. Such points as we have been able to determine with some confidence, and which probably are correct, are given in connection with *chrysocome*.

No. 15,658, Mus. Smiths. Inst., Antarctic Ocean, U. S. Ex. Ex., T. R. Peale, mounted, not in perfect plumage. The feathers of the vertex are lengthened and linear, those of the forehead less so; all are blackish. The crests are only indicated by the yellowish superciliary lines of little lengthened feathers. Under-parts white to the bill, but the gular dark beginning to show; upper-parts strongly washed with penguin-blue. Bill brownish-red. Stands 19 inches high, and seems overstuffed; tail under 3, but still the coverts so short that the rectrices noticeably project. Chord of culmen 1.40; gape 1.75; height of bill at base .75; from antiæ to tip of bill 1.00; tarsus under 1.00; middle toe and claw under 2.50.

No. 45,513, Mus. Smiths. Inst., Orange Bay, Antarctic Ocean, U. S. Ex. Ex., J. W. Dyes, Feb. 1839; exactly like the last.

No. 45,512, Mus. Smiths. Inst., Cape Horn, U. S. Ex. Ex., T. R. Peale. Similar, but plumage a little more advanced. The dark gular area is here apparent, while the blackish feathers of the vertex and the yellowish superciliary bundles are a little longer, yet the latter do not form crests.

These three specimens represent the "*Aptenodytes chrysocome ?*" of Peale, *l. c.* They appear to have been overlooked, unaccountably, by Mr. Cassin, when he did Mr. Peale's work over again; for the U. S. Ex. Ex. Ornithology contains no allusion to them.

No. . . . Mus. Acad. Philada., "Cape Horn. Presented by Dr. Ruschenberger, 5th Aug. 1857. J. C." Not adult, the throat being only partially blackish, and the crests merely indicated by yellow superciliary lines. It closely resembles three Smithsonian specimens. Chord of culmen 1.60; bill weak; tail barely 3 inches. It may be considered a suspicious circumstance that all these specimens referable to *catarractes* on account of the weak bill, short tail and slight crests, show characters reasonably explicable upon ground of immaturity.

No. . . . Mus. Bost. Soc., adult, Falkland Islands, Coll. La Fresnaye. (*Hyatt.*)

EUDYPTES CHRYSOCOME (Forst.).

Aptenodytes chrysocome, Forst., Comm. Soc. Reg. Sc. Gött. iii. 1781, 135, pl. i. Lichtenstein, Ed. Descr. Forst. 1844, 99. ? Gmelin, S. N. ii, 1788, 555, No. 1. (Quotes Forster and P.E. 984.)

Spheniscus chrysocome, Schl., M. P.-B. ix. 1866, Urin. 6.

Eudyptes chrysocome, Gould, B. Aust., vii. pl. 83 (testibus speciminibus typicis). Scl., P.Z.S. 1860, 392.

Eudyptes pachyrhyncha, Gray, Voy. E. & T. Birds, , pl. 17. Gray and Mitchell, G. of B. iii. pl. 176. Gray, Handlist, iii. 1871, 98.

Eudyptes nigrivestis, Gould, P. Z. S. 1860, 418.

Eudyptes nigriventris ! Gray, Handlist, iii. 1811, 98, lapsu.

? ? Planche Enluminée, No. 984.

No. 59,242, Mus. Smiths. Inst., Falkland Islands, lately acquired under the name of "*Eud. nigrivestis*, Gould." Bill 1.70 (chord of culmen); from antiæ to tip of bill 1.10; gape 2.00; tail about 4; wing about 7. The upper parts are very dark, especially the head and neck, which show no blue at all; the crown is jet-black, its feathers moderately lengthened, those of the forehead not reaching the occiput. A narrow pale yellow line runs from near the base of the culmen over the eye, to the occiput, and there forms a curly tuft an inch longer. This specimen certainly shows nothing whatever different from ordinary *chrysocome*, nor does Gould's description (*l. c.*) give any tangible characters. He says, indeed, that his bird is "smaller than *chrysocome*," but the dimensions he assigns (length 21¼; bill 2; tail 4; tarsi ⅞) do not bear out this statement; nor do any of the other characters hold. We judge from the nature of Mr. Gould's remarks that he compared his bird with *chrysolopha*, from which it is different in the respects he mentions. In any event, we fully concur with Prof. Schlegel, in relegating "*nigrivestis*" to *chrysocome*. Mr. Gray admits the species, in the Handlist, but by an unfortunate slip of the pen, or typographical error, it there stands as "*nigriventris*."

No. . . . Mus. Acad. Philada., New Zealand, adult. Bill of immense size; chord of culmen 2.50, greatest depth 1.20; the culminal and tomial portions highly turgid. Upper parts very dark, scarcely washed with bluish, and quite black on the head; frontal and coronal feathers lengthened and linear; crests conspicuous, light straw yellow, reaching about an inch beyond the occiput. Stands about 19 high; tail about 4.50; middle toe and claw 3.75.

No. 1684, Mus. Acad. Philada., adult, Van Diemen's Land, Coll. Gould. *One of the types of chrysocome, Gould, B. A. pl.* 83. Almost exactly like the last specimen, but not quite so heavy; tail about 4 inches. This is unquestionably true *chrysocome*, and Dr. Schlegel therefore is proved in error in assigning "*chrysocome*, Gould," among the synonyms of *chrysolopha*, Brandt.

No. 1343, Mus. Acad. Philada. New Zealand, adult, labelled "*pachyrhynchus*, Gray?" in a handwriting I do not recognize. Essentially similar to, and certainly conspecific with, the foregoing specimens; though it looks larger, this is probably due to overstuffing. Stands 19 inches; tail 4; bill 2. The head is opaque velvety black, but there is considerable blue in the color of the back. The yellow crests are precisely as in the other specimens.

No. . . . Mus. Acad. Philada. Adult; no locality nor donor given. A specimen closely agreeing with the preceding, but the bill is not nearly so heavy, though stout for its length ; it measures 1.60 long, by nearly one inch deep. The specimen is labelled "*pachyrhyncha*, Gray," by Mr. Cassin, and is certainly Gray's bird.

No. . . . Mus. Bost. Soc., no locality given, Coll. La Fresnaye. (*Hyatt.*)

This species, if it be different from *catarrhactes*, is to be distinguished by the rather larger size, very stout bill, decidedly longer tail, and prevalent darkness of the back, and especially the head. From *chrysolopha* it may be known by the less development of the crests, darker color, and heavier bill.

It is extremely difficult, if not impossible, to pick out, among the earlier notices of this species and *catarrhactes*, the names and descriptions that respectively apply to these two. Mr. Gray, indeed, throws all the eighteenth century synonymy upon *catarrhactes*, considering that his *pachyrhyncha* represents the original description of the present species; and it would be advantageous to agree with him on this point. But I cannot help thinking that Forster had two different species in view, that he named respectively *catarrhactes* (after Briss.) and *chrysocome* (n. sp.).

It is also Dr. Schlegel's opinion that Forster indicated the two species, so that I hardly see how he (Dr. Schlegel) relegates *chrysocome*, Gmelin and P. E. 984, to *catarrhactes ;* for Gmelin quotes Forster, and whatever species Forster's is, that Gmelin's must also be. The Planche Enlum., also, shows a very dark bird. I know that in this matter my judgment is quite as likely to be at fault as Dr. Schlegel's is, but I think that, all things considered, it may be best to accept the synonymy as it is here arranged, letting " chrysocome " mean *chrysocome*, and " catarrhactes " mean *catarrhactes*, in every instance, without attempting an identification upon the vague and unsatisfactory descriptions that the older authors gave.

EUDYPTES CHRYSOLOPHA, Brandt.

Eudyptes chrysolopha, BRANDT, Bull. Acad. Petersb. ii., 324. SCHLEGEL, M. P.-B. Urin. p. 7 (Excl. syn. " *chrysocome* Gould.").

"*Eudyptes chrysocome*, PELZELN " (nec Forst.). Novara Reise, Vögel, p. 140, pl. 5. (*Auct. Schlegel.*)

E. præcedenti simillimus ; sed rostro debiliore, notæo paululum clariores cristis lateralibus longissimis, procul ultra occiput porrectis, et plumi, coronalibus omnibus elongatis.

Habitat.—Maribus australibus. Ins. Falklandicis.

No. . . . Mus. Acad., Philada. No locality given. The upper parts are rather lighter colored (bluer) than in *chrysocome* (much as in *catarrhactes*), but the difference is not well marked; the head, however, has a decided bluish cast hardly visible in the opaque black of *chrysocome*. All the coronal feathers are longer, more slender, and stiffer than I have ever seen them in *chrysocome*, extending nearly two inches beyond the occiput, and forming a median vertical black crest connecting the yellow lateral plumes. The longest yellow plumes are full 3 inches in length, and reach over 4 inches behind the eye—about 7 inches from the tip of the bill: they are accompanied to their very ends by a few of the longest black plumes. This is a condition I have never seen equalled in any specimen of *chrysocome*, though the difference after all is not so decided. The bill is no shorter than in some specimens of *chrysocome* (the chord of culmen measuring 1⅝ inches long); but it is weaker than I have ever seen it in that species, being hardly ¾ of an inch deep. The tail is about 4 inches long; middle toe and claw nearly 3.00.

No. . . . Mus. Acad., Phila. No locality assigned. Exactly like the last, but the crests not quite so highly developed, though they are still noticeably longer than in *chrysocome*. The bluish cast of the upper parts, and even of the head, is well marked.

No. . . . Mus. Bost. Soc., Falkland Islands, Coll. La Fresnaye. (*Hyatt.*)

According to Dr. Schlegel, it is this species that is indicated in Gould's Handbook, p. 517, under the name of *Eudyptes* "*catarractes;*" and by Pelzeln, Novara Reise, p. 140, pl. 5, under the name of *Eudyptes* "*chrysocome.*" We do not, however, venture to so assign these names in our synonymy, especially since Dr. Schlegel is certainly wrong in his identification of Gould's "*chrysocome.*"

Although I am able to distinguish the three currently accredited species, in the few specimens examined, yet the distinctions are not of a very satisfactory nature, and I strongly suspect that when specimens enough shall have been compared, the supposed specific characters will melt insensibly into each other, so that, at most, only varietal distinction can be reasonably asserted.

Indeed, I am not sure that differences of age or season or special conditions of plumage may not be the sole basis of the supposed species.

EUDYPTES DIADEMATUS, Gould.

Eudyptes diadematus, GOULD, P. Z. S. 1860, 419. SCHLEGEL, Urin. M. P.-B. 1866, 9me, 8. GRAY, Hand-list, iii. 1871, 98.

Habitat.—Ins. Falklandicis. Novâ Zealandiâ.

Eud. chrysolophæ et chrysocomæ similis, sed major, notæo obscuriore, fusco vix griseo-cœruleo lavato, plumis superciliaribus necnon frontalibus flavissimis, his nigro-lineatis, illis breviusculis, rectis.

No. 59,241, Mus. Smiths., adult, in perfect plumage, from the Falkland Islands, received under the name of "Eud. chrysolopha." The upper parts are very dark, with barely a trace of dull penguin-blue in some places, in others, as on the head, none at all. (In these respects quite different from its nearest ally, *chrysolopha.*) The intense yellow plumes, very slender, and perfectly straight, reach hardly an inch beyond the sides of the occiput (they are longer, curly, and not so yellow, in the other species); and on the forehead they coalesce to form a large orange spot, with sharp black lines, the terminal half of each feather being black. (In all the other three crested species the lateral bundles of yellow plumes remain strictly separate.) The other feathers of the crown are perfectly black, and not much lengthened. Bill larger and more robust than in the other crested species; nasal groove very strongly impressed, dividing the maxilla into the broad, depressed, culminal part, and the bulging tomial portions; on the under mandible the feathers ascend backwards from their point of extension between the rami, as usual, but do not reach the tomia at all, but retreat to the very angle of the mouth; while the corneous part of the mandible is defined along the line of these feathers by a raised border. Chord of culmen 2.25; gape 2.50; from antiæ to tip of bill 1.75; height of bill opposite base of culmen 1.15; width do. .85; wing nearly 8; tail 5.25; tarsus about 1; middle toe and claw 2.75; whole length of the dried skin, apparently not stretched, 2¼ feet.

No. . . . Mus. Acad., Philada. No locality given. Adult; as stuffed, stands 22 inches high; chord of culmen 2.15; gape 2.75, but not quite 1 deep at deepest place; tail about 4½; wing 8¼. Similar to the Smithsonian specimen.

No. . . . Mus. Acad., Philada., male, adult, "Isles Croquets;" almost exactly like the preceding; bill not quite so large; stands about 21½ inches high.

No. . . . Mus. Acad., Phila., "Isle Macquarie." Young, or at least imperfect plumage, the throat and sides of the head below the eyes being white, slightly clouded with dusky, indicating the blackish area of the mature state; but the plumes are as largely developed, the forehead is as yellow, and the bill is as large as in the adults above mentioned. It seems to be exactly like spec. No. 3 of Dr. Schlegel's catalogue, and is from the same locality. This concurrence of white throat with intensely yellow forehead is rather in favor of the validity of the species.

These specimens appear to have stood a long time unrecognized in the Academy, the richness of the ornithological department of which only gradually appears. They are unquestionably *diadematus*. We are also pleased to identify with this beautiful species, which seems strongly marked, and is at any rate recognizable on sight by the orange forehead and other characters, a specimen that has lain for some time in the Smithsonian, labelled "*chrysolopha*." It does not appear to be contained in the British Museum. Dr. Schlegel reports three examples at Leyden; two adults, one from the Falklands, the other from New Zealand; and an "individu à gorge et côtés de la tête blancs, du reste au plumage parfait; île Macquarie, au sud de la Nouv. Zéelande."

? A shade of doubt attaches, that this may be an extreme case of *chrysolopha;* for we have in the *Eud. nigrivestis* of Gould, which is not distinct from *chrysocoma*, a state of plumage as dark as that of *diadematus*. But *diadematus* is distinguishable on sight, and no intermediate specimens have been forthcoming.

SPHENISCUS MINOR (Forst.).

Aptenodytes minor, FORST., Comm. Soc. Reg. Sc. Götting. iii. 1781, 147, No. 9. GM., S. N. 1788, 558. LATH., Ind. Orn., ii. 1790, 881. PEALE, U.S. Ex. 1848, Birds, 259, 335, No. 694. GOULD, B. Aust. vii. pl. 84.
Spheniscus minor, TEMM., Man. Orn. i. 113. SCHLEGEL, Urinatores Mus. Pays-Bas, 9me livr. 10. HYATT, Proc. Bost. Soc. Nat. Hist. 1871, p.
Eudyptila minor, BONAP.
Eudyptes (*Eudyptila*) *minor*, GRAY, Handl. 1871, iii. 99.
Aptenodytes undina, GOULD, P.Z.S. 1844, xii. 57.
Aptenodytes s. Eudyptula undina, GOULD, B. Aust. vii. pl. 85.
Eudyptes (*Eudyptila*) *undina*, GRAY, Handl. iii. 1871, 99.
Little Pinguin, LATH., Syn. Birds, vi. 572, pl. 103; Gen. Hist. x. pl. clxxx.

Habitat in littoribus Australiæ australibus, necnon Tasmaniâ, Novazealandiâ.

Minimus inter omnes, rostro brevi, crassiusculo, recto, maxillæ apice adunco, naribus nudis, plumis amotis, cauda brevi, rotundata; supra griseocœruleus, infra albus.

No. 15,661, Mus. Smiths., ♀, adult, Boyauf I., N. Zealand, U. S. Ex. Ex., T. R. Peale. One of the types of *Peale*, *op. cit.* pp. 259, 335, No. 694, and of *Cassin*, *op. cit.* pp. 355, 450, No. 687. Stands, as mounted, a foot high; was probably 14 inches long; wing 4.25; tail 1.25; the rectrices scarcely surpassing the tectrices; culmen of bill, 1.25; gape, 1.75; from antiæ to tip, only 1.00; depth of bill at base, .45, its width there .25; tarsus .75; middle toe and claw, 1.66. The feet are wholly reticulate with hexagonal plates; the hullux is completely lateral, the end of its nail barely touching the ground. The color of the feet is now undistinguishable; but the webs and the toes towards their end appear to have been darker than the rest. The bill is much shorter than the head, slenderish, compressed, the hook of the maxilla barely overarching the end of the mandible; the nostrils are entirely unfeathered, and lie in a deep narrow sulcus that runs obliquely into the maxillary tomium at the beginning of its decurvature; the antiæ are acute, but only run out a little beyond the feathers on culmen, falling short of the nostrils. Feathers occlude the interramal space, and retreat in a straight line, obliquely upward and backward, to the angle of the mouth. Thus the bill is most like that of *Spheniscus demersus* in general characters, but somewhat approaches that of *Pygoscelis*. This is one of the only two penguins that never gain a dark throat; the pictura is perfectly simple—blue above, white below; the line of demarcation passes straight through the eye, shoulder, and thigh; a spot at the end of the under surface of the wing is blue, and the border of the wing is white.

No. . . . Mus. Acad., Philada., adult, "New Holland."

No. 1336, Mus. Acad., Philada., ♂, adult, Van Diemen's Land, from the Gould collection.

No. 1338, Mus. Acad., Philada., South Australia, from the Gould collection. A specimen still showing brown down in several places, the general plumage very rich blue. Bill weak, only 1.25 long, and .37 deep at base. (Compare Nos. 1340, 1341.)

No. 1337, Mus. Acad., Philada., from the Gould collection, Van

Diemen's Land. Like No. 1338, but with more extensive patches of gray down about the head, neck, and wings.

No. 1339, Mus. Acad., Philada., from the Gould collection, South Australia. Young, in downy plumage, grayish brown above, white below. Bill one inch long.

Nos. 1340, 1341, Mus. Acad., Philada., adults. Van Diemen's Land, from the Gould collection ; *types of S. undina.* These specimens are slightly smaller than average *minor*, bluer than usual but not bluer than No. 1338, for example, and with rather weak bills. The chord of the culmen of No. 1341 is 1 inch, that of 1340 is 1.25, just as in No. 1338, and No. 15661. I cannot distinguish these specimens even as a variety.

Hyatt reports another of the U. S. Ex. Ex. specimens in the Boston Society's Museum, and one from the Coll. La Fresnaye; these, and several quoted by Gray and Schlegel, are all from the one or another of the localities above mentioned, and to which the species seems confined.

We cannot discover, in Gould's *undina*, any specific characters. The bird is one of the bluest of the penguins; and the shade of the plumage, as well as the hue of the bill and feet, varies with age or other changeable circumstances.

SPHENISCUS DEMERSUS (L.).

Manchot du Cap de Bonne Espérance, BUFF., P. E. 382.
Black-footed Penguin, EDW., Birds, pl. 94. f. 2.
Anser magellanicus, CLUS., Exot. p. 101.
Plautus pinguis, KLEIN, AV. p. 147.
Anser magellanicus clusii, WILLOUGHBY, 242.
Lesser pinguin, Phil. Trans. lviii. 37. Sparm. Voy. i. p. 24.
Cape pinguin, LATH., Gen. Syn. vi. 566, and Gen. Hist. 1824, x. 381.
Cape pinguin, var. A., LATH., Gen. Hist. x. 1824, 381; based on *Sph. nævius*, BRISS., and EDW., pl. 94. f. 1.; (= Gen. Syn. vi. 567, No. 5, A.).
Cape pinguin, var. B., LATH., Gen. Hist. x. 1824, 381.; based on *pinguin à lunettes*, PERNET, Voy. ii. 17, pl. 7, f. 3.; ID. p. 243, pl. 15.(= Gen. Syn. vi. 563, B.)
? *New Holland pinguin*, LATH., Gen. Hist. x. 1824, 388 (no citations).
Chiloe pinguin, LATH., Gen. Hist. x. 1824, 388, and Gen. Syn. Suppl. ii. 361. (Based on MOLINA.)
Three-toed pinguin, LATH., Gen. Syn. Suppl. ii. 361, and Gen. Hist. x. 1824, 393; based on Diomedea chilensis, MOLINA.
Spheniscus and *Spheniscus nævius*, BRISS., Orn. vi. 1760, 97, 99.
Diomedea chilensis et *chiloensis*, MOL., Nat. Chili, 1786, 210, 211.

Aptenodytes chilensis et *chiloensis*. Gm., S. N. i. 1788, 559.
Aptenodytes chiloensis, LATH., Ind. Orn. ii. 1790, 881.
Aptenodytes molinæ, LATH., Ind. Orn. ii. 1790, 881 (= three-toed pinguin of LATH., Gen. Syn.).
Diomedea demersa, L., S. N. i. 1766, 214, nec *Phæton dem.* ibid. 219. (Based on Will., Edw., Clus., and Briss., as above cited). Hab. "Cap. B. Spei."
Spheniscus demersus, TEMMINCK. SCHLEG., M. P.-B. 9*me* livr. 1866, Urin. p. 10. GRAY, Hand-l., iii. 1871, 98. HYATT, Proc. Bost. Soc. Nat. Hist. 1871.
Aptenodytes palpebrata, LICHT., Ed. Forst. Descr. An. 1844, 356.
Spheniscus humboldtii, Meyen, Nov. Act. Ac. Cæs. Leop. Car. 1834, xvi. Suppl. i. p. 110, pl. xxi. (Remarks upon the likelihood that it is the same as P. E. 382). Peru. SCLATER, P. Z. S. 1867, 337. (Chili.)

No. . . . Mus. Smiths. Inst., locality unknown, received June 4, 1862, from J. C. Macguire. Immature; entirely white below, with faint traces of a band across the lower throat; upper parts quite blue. As mounted, stands about 19 inches high; probably measured about 24 inches; alar expanse, 18; chord of culmen, 2.10; height of bill at base, .75

No. . . . Mus. Smiths. Inst., received with the last, locality unknown: collected March, 1846. Young bird, in the down, standing 13 inches high as mounted. The bill is weak and much shrunken; a large lozenge-shaped naked space surrounds each eye, and much of the sides of the under mandible, feathered in the adult, is also naked. The down is light smoky-brown, paler below, whitening on the belly.

No. . . . Mus. Acad. Phila., locality unknown. Apparently a youngish bird, the upper parts being brownish with slight bluish gloss. The space between the eye and bill, and an area at base of under mandible, are naked more extensively than usual.

No. . . . Mus. Acad. Phila., locality unknown. An adult, intensely colored. A narrow loral line, and the eyelids, are naked.

No. . . . Mus. Acad. Philada., locality unknown. Adult. Only the eyelids are perfectly naked. The under parts show a great number of the isolated black feathers usually seen in this species.

No. . . . Mus. Acad. Phila., locality unknown.

No. . . . Mus. Bost. Soc., young, Cape of Good Hope, Coll. La Fresnaye. (*Hyatt.*)

SPHENISCUS DEMERSUS, Var. MAGELLANICUS.

? *Le manchot des Hottentots ; manchot à bec tronqué :* P. E. 1005 (whether this var., or true *demersus* is uncertain).

Collared pinguin, LATH., Gen. Syn. vi. 571 ; LATH., Gen. Hist. x. 1824, 391.

Magellanic pinguin, LATH., Gen. Syn. vi. 569 ; Gen. Hist. x. 1824, 383.

Aptenodytes magellanicus, FORST., Comm. Soc. Reg. Sc. Gott. iii. 1871, 143, pl. 5. LATH., Ind. Orn. ii. 880. GM., S. N. i. 1788, 557. (Based on FORST., l. c., and MILL., Ill. t. 34.) PEALE, U. S. Ex. Ex. 1848, 258 and 335, No. 692. CASS, U. S. Ex. Ex. 1859, 335, 450, No. 692.

Spheniscus magellanicus, SCLATER, P. Z. S. 1860, 382.

Eudyptes (*Pygoscelis*) *magellanicus*, GRAY, Handl. iii., 1871, 99.

Aptenodytes torquata, FORST., l. c. p. 146. GM., S. N. 1788, 558. LATH., Ind. Orn. ii., 1790, 880.

"*Aptenodytes platyrhynchus*, SCOPOLI." (Manchot à collier, Sonnerat, Voy., 180. pl. 114.)

"*Aptenodytes fuscirostris*, ILLIGER."

Aptenodytes brasiliensis, LICHT., ed. FORST. Descr. Anim., 1844, 355.

Spheniscus magnirostris, PEALE, Orn. U. S. Ex. Ex. 1848, p. 263, pl. 71, f. 1, et p. 335, No. 698, teste spec. typic. ipso ! Deinde *S. demersus*, CASS, Orn. U. S. Ex. Ex. 1859, 354, specimen eundem referens.

Spheniscus demersus, ABBOTT, Ibis, 1860, 366.

Sph. demerso similis, sed major, notæo obscuriore, necnon collo antice torquato, fasciâ fuscâ per regionem inter gulam et pectus transductâ.

Habitat cum præcedente.

No. 15,659, mounted, in immature plumage, Tierra del Fuego, U. S. Expl. Exped., T. R. Peale: *type of Apt. magnirostris Peale.* The bill is one of the smallest (of *Spheniscus* proper) we have seen; the rugous parts are shrunken, and much of the bill is yellowish; the upper parts are lighter and bluer than is usual in this variety, and much as in ordinary *demersus*. There is no trace of the dark breast-band or of the lateral stripe; but the cervical half-collar distinctive of *magellanicus* is plainly apparent. This has decided us as to the proper determination of the specimen ; and of course, with this identification, comes the reference of Peale's *magnirostris*, and Cassin's " demersus," here instead of to true *demersus*. In fact, we find the specimen labelled " magellanicus?" in a handwriting we do not recognize, and we observe that Mr. Cassin has queried his private No. 683, which refers to his catalogue (*op. cit.* p. 450, No. 683), although there and on p. 354 (*op. cit.*) he lets the name " demersus" stand.

No. . . . 15,669, adult in perfect plumage, mounted, Tierra del Fuego, U. S. Ex. Ex., basis of Peale and Cassin, ll. cc. Bill, and other details of structure, exactly as in *demersus*. Larger: about 27 inches long, standing 24 as mounted; chord of culmen, 2.30; gape 2.90, tomia naked 2.25, antiæ to tip of bill 2.00, depth of bill at base 1.00, width do. .75; nostrils an inch from end of antiæ; wing about 8; tarsus, 1.50; middle toe and claw, 3.00; outer do., 2.66; inner do., 2.00. Darker than average *demersus;* the cervical half-collar and pectoral lateral horse-shoe-shaped water-line both perfect; the perfect white line of the head starts at side of base of bill, runs over eye, curves down behind ear, somewhat expands below it, and then passes forward to the throat where it joins its fellow, thus cutting off the dark collar from the general gular black.

No. 15,656, Mus. Smiths. Inst., same locality and source as the last, is also in adult condition, and perfectly similar to No. 15,669 in color, but smaller; now it stands, as mounted, only about 1½ feet, but seems to have been about 2 feet long.

No. . . . Mus. Acad. Phila. Locality unknown.

No. 1644, Mus. Acad. Phila. Straits of Magellan. Adult.

No. 1514, Mus. Acad. Phila. " Amérique meridionale."

No. . . . Mus. Bost. Soc., adult, Tierra del Fuego, U. S. Ex. Ex. (*Hyatt.*)